

## PATENT ABSTRACTS OF JAPAN

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(71)Applicant : KONICA CORP

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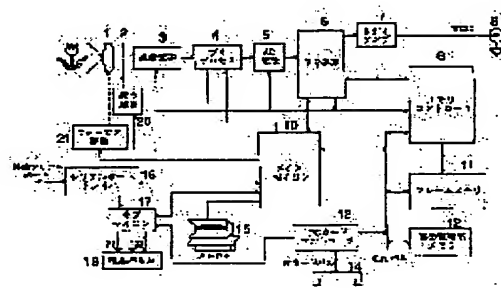
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TERADA TOSHIYUKI

(54) DIGITAL STILL CAMERA

(57)Abstract:

**PURPOSE:** To obtain a digital still camera capable of easily compositing pictures just by a camera without using a computer by providing an addition means for adding data for composite for respective picture data at the time of performing photographing so as to composite the pictures and a composite means for the pictures based on the data.

**CONSTITUTION:** The pictures are composited by a main microcomputer 10 through a sub microcomputer 17 by turning on a switch 32 after the photographing. At the time of compositing the picture in the main microcomputer 10, the pictures are selected from a memory 12 for storing the pictures, an externally connected PC card or a personal computer connected to an external serial port by a file name and a photographing mode, a composite processing is performed and write in a frame memory 11 is performed. Thereafter, recorded pictures may be displayed or recorded again in the memory 12 for storing the pictures, the externally connected PC card or the personal computer connected to the external serial port.



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CLAIMS

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[Claim(s)]

[Claim 1]A digital still camera which has a conversion method characterized by comprising the following which changes a photoed optical image into a digital signal, and a means to record image data changed into said digital signal.

An addition means which adds data for composition for said every image data when taking a photograph in order to perform picture composition.

A synthesizing means which performs picture composition based on this data for composition.

[Claim 2]The digital still camera according to claim 1 adding said data for composition to a header unit of said image data.

[Claim 3]The digital still camera according to claim 2, wherein said data for composition is the same number or a photographing mode name.

[Claim 4]The digital still camera according to claim 3, wherein said photographing mode is seriography mode or automatic exposure bracket mode.

[Claim 5]If said addition means and said synthesizing means are microcomputers, a switch for composition and a selecting switch which chooses said photographing mode are connected to this microcomputer and said switch for composition and said selecting switch are inputted, A digital still camera given in any 1 paragraph of claims 1-4, wherein said microcomputer performs picture composition based on said photographing mode.

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[Translation done.]

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## DETAILED DESCRIPTION

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[Detailed Description of the Invention]

[0001]

[Industrial Application] The invention in this application relates to the detailed digital still camera in which picture composition is possible about a digital still camera.

[0002]

[Description of the Prior Art] In the conventional digital still camera, when a photograph was taken, people had to judge which picture and which picture since any relation cannot be found mutually, the picture of each piece used for composition would combine by seeing a picture actual at the time of composition, and various pertinent information. For example, although it could surmise that a photograph was taken for composition from the information on a seriography or an automatic exposure bracket, if a picture was not actually looked at, it was not understood whether a photograph was taken in order to use it for composition truly.

[0003] Since information required in order to compound by computer etc. in the picture photoed beforehand using a computer conventionally had to be attached, picture composition was not able to be carried out out in the fields.

[0004]

[Problem(s) to be Solved by the Invention] The invention in this application makes it a technical problem to propose the digital still camera which can perform picture composition easily only with a camera not using a computer in view of the above-mentioned problem.

[0005]

[Means for Solving the Problem] In a digital still camera which has a conversion method [ in / in an aforementioned problem / the invention in this application ] which changes a photoed optical image into a digital signal, and a means to record image data from which it was changed into said digital signal, When taking a photograph in order to perform picture composition, it is solved by having had an addition means which adds data for composition for said every image data, and a synthesizing means which performs picture composition based on this data for composition.

[0006]

[Example] The example of the digital still camera in the invention in this application is described in detail based on drawing 1 thru/or drawing 5.

[0007] Drawing 1 is a block diagram of the digital still camera which carries out the invention in this application, and explains each operation first.

[0008] The image sensor 3 is CCD etc., carries out photoelectric conversion of the photographic subject information by which image formation was carried out to the image sensor 3 with the optical taking lens 1, and outputs it as an electrical signal. The Puri process part 4 performs fundamental analog processing before carrying out AD translations, such as preceding paragraph amplification with an AGC function and a clamp, and CDS. The AGC standard gain of preceding paragraph amplification can also be changed by control of the main microcomputer 10.

[0009] The AD translation part 5 changes the CCD output signal of an analog into digital data.

[0010] The signal processing part 6 processes filtering, colorization processing, knee processing, a color conversion process, etc. to the digitized CCD image data, for example, outputs to it in YCrCb form at the memory controller 9. On the other hand, the DA converter is also built in the signal processing part 6, and the colorized video signal which is inputted from the AD translation part 5 and the image data conversely inputted from the memory controller 9 can also be outputted as an analog signal. These functional changes are performed by data exchange with the main microcomputer 10, and the exposure information and focus information of a CCD signal, and white balance information can also be outputted to the main microcomputer 10 if needed.

[0011]In the memory controller 9, the digital image data inputted from the signal processing part 6 is accumulated in the frame memory 11, or the image data of the frame memory 11 is conversely outputted to the signal processing part 6. Although the frame memory 11 is an image memory which can accumulate the image data of at least one or more screens and VRAM, SRAM, DRAM, etc. are generally used, VRAM in which the bus of CPU and independent operation are possible is used here. This memory may be shared with a system memory.

[0012]The memory 12 for image storage which is the Records Department is a memory with a built-in main part, and after graphical-data-compression processing etc. are performed to the picture photoed by the frame memory 11 with the main microcomputer 10, it is stored. As an internal memory for these image storage, although there are SRAM, DRAM, an EEPROM, etc., considering the image data preservation in a memory, EEPROM is preferred.

[0013]The PC card controller 13 (PCMCIA controller) is what connects an external recording medium and the main microcomputers 10, such as an IC memory card, After graphical-data-compression processing etc. are performed to the picture photoed by the frame memory with the main microcomputer 10, it is recordable on an external recording medium via this PC card controller 13. As an external IC memory card for preservation connected via the PC card controller 13, An SRAM card, a DRAM card, an EEPROM card, etc. can be used, and direct image data may be transmitted to the recording medium of a remote place via a public line using a modem card or an ISDN card.

[0014]The stroboscope part 15 is a circuit for making a built-in stroboscope emit light, and light-emitting timing is obtained by the main microcomputer 10 which controls a photographing sequence here.

[0015]The serial port driver 16 performs signal transformation for performing information transmission of a camera body and an external instrument. Although there is a recommendation standard known under the name of RS-232 C, RS-422-A, etc. as a serial transmission means, RS-232 C is used here.

[0016]The sub microcomputer 17 controls man-machine interface, such as an operation switch of a camera body, and liquid crystal display, and performs signal transduction to the main microcomputer 10 if needed. Here, the serial input/output terminal is used for signal transduction with the main microcomputer 10.

[0017]The diaphragm actuator 20 is constituted by the auto iris etc., for example, and changes the optical diaphragm 2 by control of the main microcomputer 10.

[0018]The focal actuator 21 is for being constituted by the stepping motor, for example, changing the position of the lens 1 by control of the main microcomputer 10, and doubling the optical focus side of a photographic subject with the image sensor 3 properly.

[0019]The main microcomputer 10 mainly controls the sequence of photography, record, and reproduction, and also performs compression reproduction of a taken image, and serial port transmission with an external instrument if needed. The JPEG system standardized by CCITT and ISO is used as graphical data compression here. Although the main microcomputer 10 is made to perform this operation here, according to the capability of the main microcomputer 10, it may carry out by allotting exclusive IC of compression extension on a CPU bus.

[0020]Next, a series of basic motion to the memory record from photography is explained.

[0021]The operational mode of a camera is set up from the various switch information linked to the sub microcomputer 17, and the information for photography is outputted to the main microcomputer 10 as serial information. When performing picture composition, seriography mode and an automatic exposure bracket can be chosen with the selecting switch 31, When continuous shooting of two or more pieces can be performed at a predetermined interval when seriography mode is chosen, and an automatic exposure bracket is chosen, it can shift to predetermined exposure value and two or more pieces can be photoed.

[0022]According to this information, the main microcomputer 10 sets up the PC card controller 13 and the serial port driver 16 the memory controller 9, the signal processing part 6, the Puri process part 4, and if needed.

[0023]If the release switch S1 of the sub microcomputer 17 is pushed, the sub microcomputer 17 will give the information to the main microcomputer 10. In the main microcomputer 10, if it gets to know that S1 signal became active, an image input command is published to the signal processing part 6, and the signal processing part 6 will operate the image sensor 3, the Puri process part 4, and the AD translation part 5, and will receive a CCD image. After performing fundamental signal processing for the received CCD image data in the signal processing part 6, a low-frequency component to exposure data is created for focus information from the high frequency component of luminance data. These data is read in the signal processing part 6, and is extracted if needed, and gain control of the AGC amplifier of the actuator 20, the focal actuator 21, and also the Puri process part 4 is performed, and it is made to

converge in the main microcomputer 10 until proper exposure and focus are obtained. Depending on operational mode, an analog picture signal is outputted from the signal processing part 6, and it outputs to an external monitor from the connector 8 as an NTSC signal.

[0024]If the signal which shows that the release switch S2 was pushed is inputted into the main microcomputer 10 from the sub microcomputer 17 after converging on exposure value and a value with a proper focus, the main microcomputer 10 will output a command of incorporation to the memory controller 9. It incorporates if needed and a flashing caution signal is outputted to the stroboscope part 15 in the field timing of a picture. If the memory controller 9 receives the incorporation command of a picture, the synchronized signal from the signal processing part 6 will be detected, and image data, such as YCrCb form outputted from the signal processing part 6 to predetermined timing, will be incorporated into the frame memory 11. After the frame memory 11 ends incorporation of a picture, when the status which shows that incorporation ended the memory controller 9 is displayed and the main microcomputer 10 reads this, it gets to know that photography was completed with the main microcomputer 10.

[0025]After photography is completed, in the main microcomputer 10, graphical data compression is performed if needed and image data is transmitted to the memory 12 for image storage, the PC card by which external connection is carried out, or the personal computer connected to the external serial port.

[0026]The data about photography is added to image data at the time of compression or image transfer. The figure which recorded information on added header data is shown in drawing 2.

[0027]Drawing 2 is a mimetic diagram of the image data of three pieces when a photograph is taken in automatic exposure bracket mode, drawing 2 (A) shows eye one piece, drawing 2 (B) shows eye two pieces, and drawing 2 (C) shows eye three pieces. The lower part [ center ] is the photoed image data, and the upper part [ center ] is the added header data. From the upper row of header data, a file name, a photographing day, exposure time, photographing mode, shutter speed, and a diaphragm value are shown. The data used for picture composition in this data is which data of the file name which shows the same number, or the same photographing mode at the time of the same photographing mode. It is not necessary to necessarily add other data.

In drawing 2, for example, having taken a photograph by identical mode to the file name is shown, the same number like 001 is added and the character which shows picture composition of an automatic exposure bracket to photographing mode is added. By the above, drawing 2 (A), drawing 2 (B), and drawing 2 (C) can detect that it is the image data which should be compounded.

[0028]In repeat display operation, with the main microcomputer 10, image data is read in the memory 12 for image storage, the PC card by which external connection is carried out, or the personal computer connected to the external serial port, a picture is elongated if needed, and it writes in the frame memory 11. Then, if the command for displaying a picture on the signal processing part 6 and the memory controller 9 is published, Image data is read from the frame memory 11 with the memory controller 9, it has passed through the video amplifier 7 via the signal processing part 6, and the analog signal of a picture is outputted to the connector 8 which is an NTSC output terminal.

[0029]Thus, the function of photography of a camera, record, reproduction, a display, and transmission is attained. The main microcomputer 10 performs picture composition mentioned later via the sub microcomputer 17 by making the switch 32 for composition the one after photography.

[0030]Drawing 3 is a figure of the picture of three pieces which shifted and photoed exposure value. The picture of drawing 3 (A), drawing 3 (B), and drawing 3 (C) corresponds to the image data of drawing 2 (A), drawing 2 (B), and drawing 2 (C), respectively.

Exposure suits empty of drawing 3 (A) for high speed and a small diaphragm, the mountain and the person have become underexposure, exposure suits the mountain of drawing 3 (B) a little for high speed and a small diaphragm, overexposure and a person are that exposure is insufficient in empty, exposure suits people of drawing 3 (C) for medium speed and an inside diaphragm, and empty and a mountain have become overexposure.

[0031]Drawing 4 is a figure of the picture combined about drawing 3 (A), drawing 3 (B), and drawing 3 (C), in order to expand the dynamic range of a picture.

All of empty, a mountain, and a person are correct exposure.

[0032]Drawing 5 is a flow chart when taking a photograph in automatic exposure bracket mode. The main microcomputer 10 may perform composition of a picture and carrying out with the personal computer connected to the external serial port is also considered. When combining a picture with the main microcomputer 10, By a file name and photographing mode, the picture combined from the memory 12 for image storage, the PC card by which external connection is carried out, or the personal computer connected to the external serial port is elected, a compositing process is performed, and it writes in the

frame memory 11. Then, the image composing recorded on the frame memory 11 may be displayed, and recording on the memory 12 for image storage, the PC card by which external connection is carried out, or the personal computer connected to the external serial port again is also considered.

[0033]It carries out [ \*\*\*\*\* ], and a value may shift an exposure value equally by each piece, and may set up characteristic exposure value by each of each piece.

[0034]Although the example when a photograph was taken in automatic exposure bracket mode explained the above example, it is completely the same also in seriography mode.

[0035]

[Effect of the Invention]If it depends for any of claims 1-5 being, it is opened wide and the photoed picture can be easily chosen from the troublesomeness which adds information required in order to perform picture composition to image data.

[0036]Since only a camera can perform picture composition, without using a computer, picture composition can be performed at any places, such as the outdoors.

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DESCRIPTION OF DRAWINGS

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[Brief Description of the Drawings]

[Drawing 1]It is a block diagram of a digital still camera.

[Drawing 2]It is a mimetic diagram of the image data of three pieces when a photograph is taken in automatic exposure bracket mode.

[Drawing 3]It is a figure of the picture of three pieces which shifted and photoed exposure value.

[Drawing 4]It is the figure which combined the picture of drawing 3.

[Drawing 5]It is a flow chart when taking a photograph in automatic exposure bracket mode.

[Description of Notations]

1 Lens

3 Image sensor

4 Puri process part

6 Signal processing part

9 Memory controller

10 Main microcomputer

11 Frame memory

12 The memory for image storage

13 PC card controller

17 Sub microcomputer

31 Selecting switch

32 The switch for composition

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[Translation done.]





ことができる。

【0022】この情報に応じてメインマイコン10は、メモリコントローラ9、信号処理部6、プリプロセッサ4、また必要に応じてPCカードコントローラ13やシリアルポートドライバ16を駆使する。

【0023】サブマイコン17のレリーズスイッチS1が押されると、サブマイコン17はその情報をメインマイコン10に伝える。メインマイコン10ではS1信号がアクテブになったことを知ると、信号処理部6に画像データ命令を発行し、信号処理部6は撮像素子3、プリプロセッサ4、AD変換部5を動作させてCCD画像を取り扱う。受け取ったCCD画像データを信号処理部6で逐次的な信号処理を行った上で、再度データの高度化成分からフォーカス情報を、低周波成分から露出データを作成しておく。メインマイコン10では、これらのデータを信号処理部6から読み取り、必要に応じて絞り駆動部2やフォーカス駆動部21、更にはプリプロセッサ4のAGC増幅部のゲイン制御を行い、適正な露出やピンントを得られるまで収束をさせる。また、動作モードによっては、信号処理部6からアナログ画像信号を出力してNTSC信号としてコネクタ8より外部モニタに出力する。

【0024】露出値、ピンントが適正な値に収束した後、サブマイコン17からメインマイコン10にレリーズスイッチS2が押されたことを示す信号が入力されると、メインマイコン10はメモリコントローラ9に取り込みの命令を出力する。また、必要に応じて取り込み画像のフィールドタイミングでメモリコントローラ9に発光信号を出力する。メモリコントローラ9で画像の取り込み命令を受ける。信号処理部6からの同期信号を輸出し、所定のタイミングで信号処理部6から出力されるYCbCr形式などの画像データをフレームメモリ11に取り込む。フレームメモリ11が画像の取り込みを終了すると、メモリコントローラ9は取り込みが終了したことをステータス表示し、これをメインマイコン10が読み取ることで、メインマイコン10で撮像が終了したことを知る。

【0025】撮像が終了した後にメインマイコン10では必要に応じて画像圧縮を行い、画像データから外部に接続されているパーソナルコンピュータへ画像データを転送する。

【0026】画像データには、圧縮時若しくは画像伝送時に、撮影に関するデータを付加する。付加したヘッダデータに情報を記録した図を図2に示す。

【0027】図2はオートブラケットモードで撮影したときの3つの画像データの模式図であり、図2(A)は1フレーム、図2(B)は2フレーム、図2(C)は3フレームを示す。中央より下部は撮影された画像データであり、中央より上部は付加されたヘッダデータである。ヘッダデータの上部より、ファイル名、撮影日、撮影時間、撮影モード、シャッタ速度、絞り値を示す。このデータの中で

画像合成に用いるデータは、同一撮影モードのときは同一番号を示すファイル名。若しくは同一の撮影モードの何れかのデータであり、他のデータは必ずしも付加する必要がない。なお図2において、ファイル名に同一モードで撮影したことを示す。例えば001の如き同一番号が付加され、撮影モードにオートブラケットの画像合成を示す文字が付加されている。以上により、図2(A)、図2(B)及び図2(C)が、合成すべき画像データであることを検出できる。

【0028】再生表示動作ではメインマイコン10で、画像データメモリ12、外部に接続されているPCカード、あるいは外部シリアルポートに接続されているパーソナルコンピュータから画像データを読み取り、必要に応じて画像の伸縮を行いフレームメモリ11に書き込む。この後、信号処理部6とメモリコントローラ9に画像を表示するための命令を発行すると、メモリコントローラ9でフレームメモリ11より画像データを読み取り、信号処理部6を介してビデオアンプ7を経てNTSC出力端子であるコネクタ8へ画像のアナログ信号を出力する。

【0029】このようにしてカメラの撮影、記録、再生、表示、伝送の機能は達成される。更に、撮影後に合成用スイッチ22をオンさせるとにより、サブマイコン17を介してメインマイコン10により、後述する画像合成を行う。

【0030】図3は、露出値をずらして撮影した3つの画像の図であり、図3(A)、図3(B)、図3(C)の画像はそれぞれ図2(A)、図2(B)、図2(C)の画像データに対応する。図3(A)は露出不足になっており、図3(B)はやや高速度、絞りのため山に露出が合い、空は露出過度、人は露出不足になっており、図3(C)は中速度、絞りのため人に露出が合い、空と山は露出過度になっている。

【0031】図4は、画像のダイナミックレンジを拡大するために、図3(A)、図3(B)、図3(C)について合成した画像の図であり、空、山、人が全て適正露出になっている。

【0032】図5は、オートブラケットモードで撮像を行うときのフローチャートである。画像の合成は、メインマイコン10で行なってもよいし、外部シリアルポートに接続されたパーソナルコンピュータで行うことも考えられる。メインマイコン10で画像の合成を行うときは、ファイル名と撮影モードによって、画像データメモリ2、外部に接続されているPCカード、若しくは外部シ

リアルポートに接続されているパーソナルコンピュータから合成する画像を輸出し、合成処理を行い、フレームメモリ11に書き込む。この後、フレームメモリ11に記録された合成画像を表示してもよいし、再び画像データメモリ12、外部に接続されているPCカード、若しくは外部シリアルポートに接続されているパーソナルコンピュータに記録することも考えられる。

【0033】また、画像ずらし値は各露出でEV値を等分にずらしてもよいし、各露出それぞれで等々の露出値を設定してもよい。

【0034】なお、以上の実施例はオートブラケットモードで撮影を行ったときの例で説明したが、逆撮像モードでも全く同様である。

【0035】

【発明の効果】請求項1～5の何れかによれば、画像合成を行うために必要な情報を画像データに付加する煩わしさから開放され、撮影された画像を容易に選択できる。

【0036】また、コンピュータを用いずにカメラのみで画像合成を行うことができるので、野外等のいかなる場所でも画像合成を行うことができる。

【図面の簡単な説明】

【図1】デジタルステルカメラのブロック図である。

【図2】オートブラケットモードで撮影したときの3つの画像データの模式図である。

【図3】露出値をずらして撮影した3つの画像の図である。

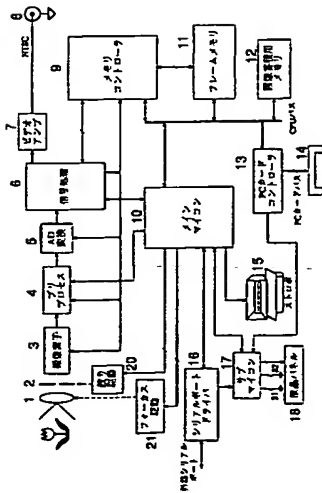
【図4】図3の画像を合成した図である。

【図5】オートブラケットモードで撮像を行うときのフローチャートである。

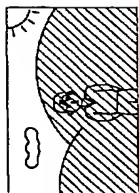
【符号の説明】

- 1 レンズ
- 3 撮像素子
- 4 プリプロセッサ
- 6 信号処理部
- 9 メモリコントローラ
- 10 メインマイコン
- 11 フレームメモリ
- 12 画像データメモリ
- 13 PCカードコントローラ
- 17 サブマイコン
- 31 選択スイッチ
- 32 合成用スイッチ

【丁丑】



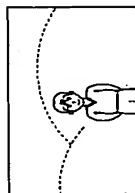
[23]



(8)



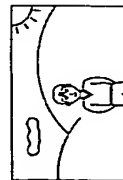
(c)



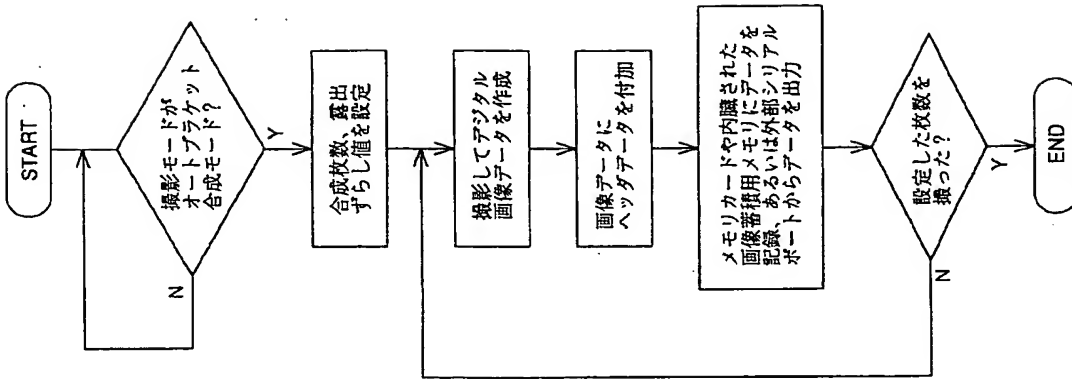
【图2】

(A)	(B)	(C)
No 000001, ling 94 00 27 14 00 27 montage a-bracket 500 11	No 000002, ling 94 00 27 14 00 27 montage a-bracket 250 8	No 000003, ling 94 00 27 14 00 27 montage a-bracket 125 5.6

【圖4】



**【5】**



フロントページの続き

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